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Preparing for the Entry-into-Force of the U.S. Additional Protocol at the National Security Laboratories[1]

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On January 6, 2009, the United States became the last of the NPT-recognized nuclear weapons states to have an Additional Protocol (AP) enter into force (EIF), a decision made by then-President George W. Bush, who signed the U.S. AP on December 30, 2008. Although just a week passed between the President's decision to sign the document and EIF via deposit with the International Atomic Energy Agency (IAEA), the fact is that the United States had been preparing to comply with the AP for several years. Like the standard Additional Protocols negotiated with non-nuclear weapons states parties to the NPT, and unlike those of some nuclear weapons states, the U.S. Additional Protocol includes provisions for a detailed expanded declaration (Article 2) and for Complementary Access (Articles 4-6) to additional locations and information. For that reason, considerable effort was devoted to preparing U.S. equities to implement the AP and assure government stakeholders that national security information would not be "at risk." Within the U.S. Department of Energy (DOE), nowhere was this more evident than across the Department of Energy's (DOE) network of national laboratories, particularly among the National Nuclear Security Administration's (NNSA) national security laboratories – Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL) and Sandia National Laboratories (SNL).

Within the NNSA, the Office of International Regimes and Agreements (NA-243) has been the lead coordinator for preparing all U.S. DOE national laboratories for the EIF of the U.S. AP. NA-243 initiated these efforts in 2003 and has since provided annual funding to the national laboratories to support AP implementation. Each year, NNSA tasked laboratory personnel with providing DOE with an unofficial draft declaration describing AP-eligible activities taking place at each respective U.S. national laboratory. As the Bush administration's decision to bring the U.S. AP into force neared, NNSA also tasked the national laboratories with preparing for and experiencing a mock IAEA complementary access (CA) request, an activity allowable in the U.S. Additional Protocol.

This paper describes the experience of conducting and preparing for draft declaration exercises and preparing for and participating in a mock complementary access exercise at Lawrence Livermore National Laboratory.

PERSONNEL

To prepare for the EIF of the U.S. AP, Lawrence Livermore National Laboratory has tasked experts with both a broad understanding of potentially declarable activities taking place across the laboratory and an

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acute understanding of international safeguards with managing laboratory-based implementation of the AP. It is important that personnel have a broad-but-thorough understanding of laboratory activities because all of the hundreds, even thousands, of projects taking place at LLNL must at least be reviewed for potential inclusion in the LLNL declaration, although ultimately only a handful may be found to be eligible to be declared. It also is important that personnel have an understanding of the international safeguards system, and particularly the Additional Protocol, because it is important to understand what is and is not declarable under Article 2 and because the IAEA may request additional information about, and access to locations associated with, a declarable activity in seeking to verify the U.S. declaration.

AP implementation at a U.S. national laboratory involves personnel across multiple disciplines.

1. Additional Protocol Coordinator (APC) – The APC is the leader of implementation efforts at the laboratory. In LLNL's case, this person resides in the NNSA Livermore Site Office, which functions as the oversight office of LLNL for DOE Headquarters. The APC is ultimately responsible for submitting LLNL's activities to DOE HQ for consideration in the U.S. declaration to DOE.
2. The AP Development Team
    a. AP experts – LLNL relies upon AP experts to determine what activities and projects are declarable and may be relied upon to understand and assist in the hosting of a complementary access request by the IAEA.
    b. Program experts – LLNL relies upon program experts to have a broad understanding of the various projects and activities taking place across the multiple programs that exist at the laboratory. Program experts must review all projects and activities within each program for inclusion into the laboratory's declaration. At LLNL, the program expert has been tasked with writing the laboratory's submission to DOE Headquarters.
3. The AP Technical Review Team – The technical review team evaluates the content of the laboratory's declaration to DOE Headquarters.
4. The AP Security Review Team – The security review team consists of personnel across key disciplines, including:
    a. Operational Security (OPSEC) – OPSEC personnel are critical in helping the laboratory prepare procedures to protect on-site equities in the event of a complementary access visit.
    b. Building and Facility Managers – These managers review all locations identified in the laboratory's declaration for safety, security and accountability (managed access).
    c. Foreign National Visits and Assignments – Given that a complementary access request from the IAEA will be limited to inspectors that are foreign nationals, FNVA personnel are important in preparing for the possibility that LLNL will provide access to a foreign national IAEA inspector on short notice.
    d. Export Control and Classification – LLNL participates in research and development that may be considered sensitive and although elements of these activities may be declarable to the IAEA, it is important that LLNL's export control and classification personnel review the laboratory's declaration to ensure that the information provided therein complies with U.S. laws and regulations and with DOE policy.

The personnel identified across these four groups also work together to develop program security, including the preparation and updating of a security plan in the event of a CA request, and a safety plan to determine if the laboratory can account for the safety of IAEA personnel in the event of a CA request.

SOFTWARE

To support all of the phases of the declaration process, DOE developed three pieces of software that, as a suite, make up the DOE Additional Protocol Reporting System (APRS). For LLNL, the first and second of the three pieces of software are used to assist with properly discriminating declarable from non-declarable projects and with preparing the declarations.

1. Declaration Decision Assistant (DDA) – the DDA provides assistance in identifying activities that may be declarable under each article of the AP.
2. Declaration Writing Assistant (DWA) – the DWA imports information from the DDA into a format useful for creating the declaration line items.
3. Declaration Review Assistant (DRA) – the DRA assists DOE and in reviewing and approving the declarations and providing feedback.

LLNL DECLARATIONS

Although LLNL cannot share publicly the details of the laboratory's activities submitted to DOE for consideration into the U.S. AP declaration to the IAEA, it would be accurate to state that eligible activities at LLNL are typically declarable under Article 2.a.(i) of the U.S. Additional Protocol because the work concerns nuclear fuel cycle research and development not involving nuclear material. The specific relevant language:

> Article 2
>
> a. The United States shall provide the Agency with a declaration containing:
>
> (i) A general description of and information specifying the location of nuclear fuel cycle-related research and development activities not involving nuclear material carried out anywhere that are funded, specifically authorized or controlled by, or carried out on behalf of, the United States.

Each activity reported in a declaration is called a "declaration line item" (DLI). If the U.S. government declares ten activities to the IAEA, the declaration will consist of ten DLIs.

Eventually the LLNL AP team submits the laboratory's declaration to DOE HQ following review and approval by the LSO. If the U.S. government elects to include any of LLNL's activities in the U.S. declaration, the laboratory may become eligible for a CA request during which the IAEA may seek to verify any of the several activities itemized therein. To do so, the IAEA may request to perform a complementary access visit. In the U.S. Additional Protocol, activities declared under Article 2.a.(i) are eligible for complementary access under Article 5.b.

> Article 5
>
> The United States shall provide the Agency with access to:

b. Any location identified by the United States under Article 2.a.(i), Article 2.a.(iv), Article 2.a.(ix)(b) or Article 2.b, other than those referred to in paragraph a.(i) above, provided that if the United States is unable to provide such access, the United States shall make every reasonable effort to satisfy Agency requirements, without delay, through other means.

The IAEA, however, is not limited to requesting a complementary access visit solely based on the activities reported in the U.S. declaration. The IAEA can request a complementary access visit to perform activities such as location-specific environmental sampling. Such access is allowable under Article 5.c., provided that its purpose is to resolve a specific question or inconsistency relating to the correctness and completeness of the U.S. declaration.

Article 5

The United States shall provide the Agency with access to:

c. Any location specified by the Agency, other than locations referred to in paragraphs a. and b. above, to carry out location-specific environmental sampling, provided that if the United States is unable to provide such access, the United States shall make every reasonable effort to satisfy Agency requirements, without delay, at adjacent locations or through other means.

MANAGED ACCESS and NATIONAL SECURITY EXCLUSION

Managed access is the process of preparation and operations to ensure the protection of classified, proprietary and sensitive information and technologies, while providing sufficient access to allow fulfillment of the complementary access mandate.

As also is true for non-nuclear weapon states with APs in force, the United States is permitted to manage access under Article 7 of the U.S. AP in order to "prevent the dissemination of proliferation sensitive information, to meet safety or physical protection requirements, or to protect proprietary or commercially sensitive information." For national security laboratories in a nuclear weapon state, managed access is especially relevant. Indeed, as a nuclear weapons state under the NPT, the United States is obligated under Article 1 not "to assist, encourage or induce any non-nuclear weapons State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices…" Conversely, Article 2 requires non-nuclear weapons states not to "receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices." These obligations extend to the sharing of information with IAEA personnel, such as inspectors, who are citizens of nuclear and non-nuclear weapons states. Specific managed access measures are detailed in the subsidiary arrangements of the U.S. Additional Protocol.

Like other states that have negotiated Additional Protocols but are not non-nuclear weapon states parties to the NPT, the United States may elect to exclude access to the IAEA using the "national security exclusion" (NSE) as written under Article 1.b of the U.S. AP.

Article 1

A. The United States shall apply, and permit the Agency to apply, this Protocol, excluding only instances where its application would result in access by the Agency to activities with direct national security significance to the United States or to locations or information associated with such activities.

The NSE allows the United States to restrict access by the IAEA to any activities and/or information considered to be of "direct national security significance." If managed access cannot be used to protect activities and/or information of direct national security significance effectively at Lawrence Livermore National Laboratory, the United States may elect to invoke the NSE.

COMPLEMENTARY ACCESS TRAINING and FIELD EXERCISE

In August 2008, AP subject-matter experts (SME) with prior IAEA Safeguards experience led a two-day training and field exercise at LLNL presented for members of the respective Additional Protocol teams at LLNL, LANL and SNL. On the first day, the SMEs presented a training based on five modules: Additional Protocol Overview; Complementary Access Overview; Complementary Access Justifications and IAEA Inspector Activities; IAEA Preparation for Complementary Access under the Additional Protocol and the Use of Proliferation Indicators; and Exit Interview, Post-Complementary Access Activities, and Capping.

The second day was reserved for the Complementary Access field exercise, which together with some pre-exercise correspondence simulated all phases of an IAEA complementary access visit to an NNSA national security laboratory:

- IAEA analysis of the AP declaration and request for clarification. In the weeks leading up the field exercise, the team playing the role of the IAEA had reviewed LLNL declaration line items from the previous year's NNSA-funded declaration preparation activity, and they also had reviewed open-source information concerning past, current, and planned nuclear fuel cycle related activities at LLNL. Drawing on this information, they identified hypothetical questions that the IAEA might pose concerning declared activities or about the completeness of the declaration. A few days before the field he exercise itself, the play included simulation of transmission of an Article 4.d letter from the IAEA to the U.S. point of contact requesting expanded information or clarification concerning declared activities or inconsistencies at LLNL, and preparation of U.S. responses to those questions.
- Complementary access notification. For purposes of the exercise, the play assumed that despite whatever clarifications may have been provided by the U.S. in response to the IAEA letter above, the IAEA nevertheless elected to request complementary access. On the day before the field exercise, the mock U.S. point of contact received a 24-hour advance written request (as per Article 4.c of the AP) for complementary access to certain locations and activities at LLNL.
- The complementary access visit itself. The field portion of the exercise included the simulated IAEA team's arrival at Livermore, an initial meeting outside the gated laboratory site and various entry-processing activities, substantive discussions concerning the IAEA questions and provision of additional information in some cases as appropriate, discussions concerning the necessity and safeguards relevance of physical access to certain locations, and a close-out meeting.

The exercise served multiple objectives. First, the mock inspection served as an opportunity for LLNL to gauge its level of readiness in the event of an IAEA complementary access request. The LLNL Additional Protocol team began preparing for the mock inspection team weeks in advance of the actual field exercise. Given the challenge of preparing for a CA request and a possible on-site visit of an inspection team consisting of foreign nationals, all of which could take place with only 24 hours notice, the various disciplines within the team, whether operational security or export controls and classification, needed not only to prepare themselves, but also their respective staffs for a potential CA visit. The AP team trained regularly for AP implementation, held regular weekly meetings, interviewed and prepared relevant "principal investigators" (PI), and performed safety and security walkthroughs, including the preparation of a security plan in the event of a CA request.

Second, the exercise was an opportunity to put into practice the security plan that the LLNL AP team had prepared specifically to address the possibility of a CA request from the IAEA. The security plan is a critical document that provides guidance on:

- Classification – All declaration activities submitted by LLNL are unclassified.
- Access control and physical security protection – managed access, clearances and badges, inspection locations, routes to locations, escorting, additional access requests.
- Emergency response.
- Document control and accountability – Transmission of documentation, storage, destruction and note taking.
- Computer security – IAEA inspector computers, LLNL computers, displaying information to inspectors.
- Communication with IAEA inspectors.
- Equipment – prohibited and controlled items, personally-owned electronics, government-owned electronics, IAEA-owned electronics, IAEA toolkit, cameras, environmental-sampling equipment.
- Security incidents.
- Pre-visit requirements.

At all phases of the exercise, the security plan proved important, including early on when the inspectors attempted to enter the controlled laboratory grounds with only their IAEA credentials and were turned away and referred to the site pass office; immediately thereafter when LLNL personnel greeted the inspectors at the laboratory's central gate and escorted them to a "common access area," an "off-site" location where the LLNL AP team and the inspectors could hold an entrance meeting to discuss the purpose and course of the visit; and later when the LLNL hosts decided to allow the inspectors managed access to the laboratory to interview personnel associated with the DLIs in question.

Third, the mock inspection provided an opportunity for all relevant LLNL personnel, including the APC, the DOE Headquarters representative(s), and the LLNL AP lead and subject matter experts to engage with the mock inspectors. As part of the exercise design, the IAEA team's line of questioning centered

not only on some of the LLNL activities described in the draft declaration, but also on activities unrelated to any of the line-items in the declaration. Indeed, this process had actually started several weeks earlier when LLNL personnel received and responded to the mock Article 4.d letter and who would now be expected to defend or uphold the positions communicated in the response. The exercise allowed the LLNL AP team to experience addressing this questioning, taking time to meet away from the inspectors to discuss and reach agreement on a response and to ensure that responses went through the appropriate interlocutor (the APC). The exercise also provided individual PIs with experience in responding to questions from the IAEA inspection team via the interlocutor.

In practice, the entrance meeting and PI interviews were a three-quarter day session during which the LLNL AP team (including PIs), surrounded by observers, in some instances challenged the safeguards relevance of certain questions posed by the mock inspection team and also had to consider whether responses would involve issues of direct national security significance or would reveal commercially sensitive information. The LLNL Additional Protocol team agreed, as did many of the observers from other laboratories that the exercise was immensely helpful in preparing for and managing a complementary access visit.

LESSONS LEARNED

Considered a success, the LLNL AP team's management and handling of the CA field exercise nevertheless presents an opportunity to learn some lessons and note valuable takeaways. Some of these lessons and takeaways include:

- Roles and Responsibilities – It is extremely important that each member of any AP team has a clear understanding of his/her role, particularly as there are multiple disciplines represented and a team may consist of a dozen or more people. In addition, it is important that each member of the AP team and all PIs identify a back-up who is capable of inserting him/herself into a CA visit. Note that PIs may change each year with each new declaration.
- Laboratory Declarations
    - The AP team and PIs who may be subject to questioning from the IAEA should be aware that the line of questioning may address relevant activity taking place up through that very day. The inspectors are not limited to asking questions about activities taking place in the specific time period as identified in the declaration.
    - A declaration may include information about cooperation with another named entity or institution within the United States. To ensure completeness of the U.S. declaration, an effort should be made to inform other entities and institutions of an intention to include their name in a declaration, which informs or reminds the partner of the responsibility to consider declaring the activity.
    - An IAEA request for additional information or a CA visit would initiate activity among many personnel across multiple disciplines, many of whom may be unfamiliar with the activity in question and would benefit from a short and/or long description of the DLI under investigation. The PI should prepare this

statement once a request for additional information from the IAEA has been received.

- Discussions
  - When engaged in discussions with the IAEA during a CA visit, seating arrangements are important for the U.S.-based team as typically, most communication from the U.S. side will be filtered through the APC. Therefore, the APC should always sit immediately next to the representative from DOE Headquarters.
  - There should always be a skilled note-taker to establish a record of the meeting, which may last several hours.
  - At the earliest possible moment, the host or other appropriate personnel should provide the entire group with a safety and security briefing. This should take place each day and each time the location of a meeting changes.
- Laboratory personnel must account for unforeseen requirements for all relevant PIs, including PIs who are non-U.S. citizens who may need access to a room or a computer heretofore unavailable to foreign nationals due to laboratory policy.
- All members of the AP team need to complete DOE mandated AP training, particularly as team members cycle on and off the team.
- Laboratory personnel assigned with AP implementation need to understand laboratory policy regarding visits by foreign nationals.